UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,717	09/16/2005	Zhinong Ying	9342-81	7930

20792 7590 12/01/2006

MYERS BIGEL SIBLEY & SAJOVEC
PO BOX 37428
RALEIGH, NC 27627

EXAMINER	
KARACSONY, ROBERT	
ART UNIT	**PAPER NUMBER**
2892	

DATE MAILED: 12/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/549,717	YING, ZHINONG	
	Examiner	Art Unit	
	Robert Karacsony	2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09162005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of a certified copy of the EP 03075785..0 application referred to in the oath or declaration or in an application data sheet. If this copy is being filed to obtain the benefits of the foreign filing date under 35 U.S.C. 119(a)-(d), applicant should also file a claim for such priority as required by 35 U.S.C. 119(b). If the application being examined is an original application filed under 35 U.S.C. 111(a) (other than a design application) on or after November 29, 2000, the claim for priority must be presented during the pendency of the application, and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior foreign application. See 37 CFR 1.55(a)(1)(i). If the application being examined has entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the claim for priority must be made during the pendency of the application and within the time limit set forth in the PCT and Regulations of the PCT. See 37 CFR 1.55(a)(1)(ii). Any claim for priority under 35 U.S.C. 119(a)-(d) or (f) or 365(a) or (b) not presented within the time period set forth in 37 CFR 1.55(a)(1) is considered to have been waived. If a claim for foreign priority is presented after the time period set forth in 37 CFR 1.55(a)(1), the claim may be accepted if the claim properly identifies the prior foreign application and is accompanied by a grantable petition to accept an unintentionally delayed claim for priority. See 37 CFR 1.55(c). The form submitted by the applicant is not for claims to foreign priority but for applications preceding foreign priority.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5-8 and 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yangagisawa et al. (US 6,369,762; hereafter '762) in view of Shoji et al. (US 6,771,223; hereafter '223).

A diversity radio antenna comprising,

A ground substrate (Fig. 1A, 1),

First and second elongated antenna elements (Fig. 1A, 3a & 3b), each extending between respective first and second opposing ends thereof in a plane parallel to and spaced from the ground substrate (Fig. 1A), and

An excitation electrode (Fig. 1A, 2) interposed between said respective first ends (Fig. 1A), each antenna element (Fig. 1A, 3a & 3b) having one grounding point connectable to the ground substrate (Fig. 1A; Abstract).

'762 fails to teach the first antenna element has a first ground connector switch means selectively connecting or disconnecting the first antenna grounding point to the ground substrate, and the second antenna element has a second ground connector switch means selectively connecting or disconnecting the second antenna grounding point to the ground substrate, wherein said ground connector switch means are configured to selectively connect one or both of said

antenna elements to said ground substrate for controlling radiation beam pattern and polarization diversity of the antenna. However, '223 teach a suitable means to achieve polarization diversity as well as radiation beam pattern diversity. "In the patch antenna (Fig. 16, 152), by switching between ground points (Fig. 16, 114a & 114b) instead of feed points, switching between planes of polarization can also be realized (col. 1/lines 44-58)," therefore changing to different radiation beam patterns. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the ground switching means of '223 with the antenna of '762 in order to have increased the versatility of the antenna by enabling polarization diversity, both vertical and horizontal polarization.

Claim 2: '762 teaches that the grounding points are configured at said respective second ends of the first and second antenna elements (Fig. 1A; col. 2/lines 57-59).

Claim 3: '762 teaches that the first and second antenna elements extend substantially perpendicular to each other in said plane (Fig. 1A).

Claim 5: '762 teaches that the excitation electrode is capacitively coupled to said respective first ends of the first and second antenna elements (Abstract).

Claim 6-8: Claims 6-8 are rejected for substantially the same reasons as claim 1. The the switches of '223 are capable of both being active therefore both antennas are capable of being grounded simultaneously thus obtaining a circular polarization.

Claim 11: '762 teaches that each of the first and second antenna elements have an electrical length of one quarter of a predetermined radio frequency wavelength (col. 3/lines 5-7).

Claim 12. '762 teaches a dielectric member is interposed between the plane and the ground substrate (Fig. 1A, 6; col. 5/lines 10-30).

Claim 13: '762 teaches that the dielectric member is made of a ceramic material (col. 5/lines 24-25).

Claim 14: '762 teaches that the antenna elements and the excitation electrode are provided on a first surface of the dielectric member, whereas the ground substrate is formed adjacent to a second surface of the dielectric member, opposite and parallel to the first surface (col. 5/lines 10-14).

Claim 15: '762 teaches that the antenna elements and the excitation electrode are formed by a coat of an electrically conductive material provided on the first surface, whereas a first and second spacing between the excitation electrode and said first and second antenna element, respectively, are formed by etching of the coat (col. 5/lines 10-21).

Claim 16: '762 teaches that a radio frequency feed conductor (5) extending from the excitation electrode along a side surface of the dielectric member, to a feed pad (4) at the second surface (col. 6/lines 33-46).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over '762 in view of '223 as applied to claim 1 above, and further in view of Gothard et al. (US 6,600,456, hereafter '456).

'762 in view of '223 teach all the limitations of claim 1. '762 in view of '223 fail to teach a MEMS switch configured to control the switching action of each of said ground connector switch means. However, '456 teaches MEMS switches for use in antennas "have very fast response times and an extremely small profile (col. 15/lines 47-49)." Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have

used the MEMS switch of '456 as the switching means of '762 in view of '223 in order to have reduced the size of the of the antenna.

5. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over '762 in view of '223 as applied to claim 1 above, and further in view of Monma et al (US 6,211,830, hereafter '830).

'762 in view of '223 teach all the limitations of claim 1. '762 in view of '223 fail to teach the ground connector switch means are configured to selectively connect the ground substrate to said antenna elements over a predetermined impedance or inductive impedance. However, '830 teach the use of an inductive impedance between an antenna element and ground, which changes the directivity pattern of the antenna (col. 2/lines 16-18; col. 6/lines 21-27), in turn, reducing radio wave interference by an obstacle (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the inductive impedance of '830 with the ground connecting means of '762 in view of '223 in order to have changed and to have a better control over the directivity pattern of the antenna. (i.e. to have increased tunability of the antenna.)

6. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over '762 in view of '223 as applied to claim 1 above, and further in view of Robin (US 2004/0174302, hereafter '302).

Claim 17: '762 in view of '223 teach all the limitations of claim 1. '762 in view of '223 fail to teach the ground substrate is formed as a material layer in a printed circuit board. However, '302 teaches that it is suitable for the PCB to also function as a ground plane for an internal antenna device [0028]. The selection of something based on its known suitability for its

intended use has been held to support a prima facie case of obviousness. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the PCB board as a ground plane of '302 as the ground substrate of '762 in view of '223 with a reasonable expectation of success.

Claim 18: '762 in view of '223 teach all the limitations of claim 18, as discussed in claim 1. They fail to teach a radio communication terminal comprising a diversity radio antenna. However, '302 teach, "Internal antennas have been used for some time in portable radio communication devices. There are a number of advantages connected with using internal antennas, of which can be mentioned that they are small and light, making them suitable for applications wherein size and weight are of importance, such as in mobile phones [0002]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the antenna of '762 in view of '223 with a portable radio communication device as taught in '302 to have used their small size and light weight as an advantage in making them suitable making them suitable for applications wherein size and weight are of importance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Karacsony whose telephone number is 571-270-1268. The examiner can normally be reached on M-F 7:30-5 EST with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RK/RK

MICHAEL B. CLEVELAND
SUPERVISORY PATENT EXAMINER